SCAR Sub-Group	**ISMASS**
SG / SC	PS
Person Responsible:	Heiko Goelzer

XXXVII SCAR Delegates Meeting

India, September 2022

Ice Sheet Mass Balance and Sea Level (ISMASS)

2020-22 Report

Summary

Report Author(s)

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Summary of activities from 2020-22

ISMASS is dedicated to both Arctic and Antarctic science and is supported by SCAR, CliC, and IASC. The following information does not directly concern Antarctica but Greenland. However, the tools are common for both ice sheets. ISMASS promoted an intercomparison project (**SMBMIP**, also in the framework of ISMIP6) which is being led by Dr. Xavier Fettweis (University of Liege, Belgium; Xavier.Fettweis@uliege.be and ISMASS member) and has recently evaluated regional climate model (RCM), positive degree day (PDD) and global climate model (GCM) estimates of surface mass balance (SMB) for the Greenland Ice Sheet, with the goal of forcing ice sheet models with reconciled information from SMB models. The results are published in The Cryosphere: Fettweis, X. et al.: GrSMBMIP: intercomparison of the modelled 1980–2012 surface mass balance over the Greenland Ice Sheet, The Cryosphere, 14, 3935–3958, https://doi.org/10.5194/tc-14-3935-2020, 2020.

Virtual EGU 2021 session on ice sheet mass balance and sea-level. ISMASS has organized a joint session with ISMIP6 titled “Integrating models and observations for the estimation of ice sheet mass balance and sea level, incorporating ISMASS/ISMIP6” at vEGU21: Gather Online, 19–30 April 2021.

Hybrid EGU 2022 session on ice sheet mass balance and sea-level. ISMASS organized a joint session with ISMIP6 titled “Ice sheet mass balance and sea level: ISMASS/ISMIP6 and beyond” at the General Assembly 2022, 23–27 May 2022.

The Ice Sheet Model Intercomparison Project for CMIP6 (ISMIP6), with ISMASS chair Heiko Goelzer taking a leading role in the Greenland projections, has delivered

key publications that formed an important basis for the latest IPCC assessment report (AR6) for both the Greenland an Antarctic ice sheets (see publication list)

In connection with Cryosphere 2022, the ISMASS Consortium organises a special session on recent and future ice-sheet changes (Ice sheets: weather versus climate) within the IGS Symposium to be held in Reykjavik in August 2022. This **1.5-day workshop** will explore the degree to which short-term fluctuations and extreme events in the ice sheets (both Greenland and Antarctica) in the last two decades reflect their longer-term evolution and response to ongoing climate change. The workshop is sponsored by CliC, IASC and SCAR.

The 2022 allocated budget of 6350 USD is used for the ISMASS workshop in Reykjavik, especially to accommodate early career researchers to attend the meeting.

Key challenge was the ongoing Covid-19 pandemic, which reduced ISMASS meeting activities during this reporting period.

Summary Budget 2021 to 2024

	2021	2022	**2023**	**2024**
	Spent	Allocated	Request	Request
(US$)	0	6350	2500	2500

Progress to date

Sub-group Outcomes Summary

Sub-group	Activity/Outcome/Benefit/Achievement
Model intercomparisons and ISMIP6	ISMASS has a strong expertise in model intercomparisons. ISMIP6 is designed to deliver projections of the ice sheet contribution to sea level rise. ISMIP6 brings together a consortium of international ice sheet models and coupled ice sheet – climate models. This effort explored the sea level contribution from the Greenland and Antarctic Ice Sheet in our changing climate and assess the impact of large ice sheets on the climate system.
SMB model intercomparison	SMBMIP Greenland

Sub-group Cash Flow

(Since previous report to Delegates in 2020)

Sub-group	Allocation	Amount spent 2020	2021	2022

Future plans

Planned activities in 2022 to 2024

Sub-group	Planned activity
Ice sheets: weather versus climate	Workshop in Reykjavik (August 2022)
Involvement in INSTANT	ISMASS has a strong expertise in ice sheet modelling and INSTANT will investigate the link between past and future ice sheet changes on long and on short timescales in Antarctica. Exchanges with INSTANT will be beneficial for both parties. Ritz is leading a sub-committee to work on ice sheet models bridging different time and spatial scales.
Model intercomparisons and ISMIP6	ISMASS has a strong expertise in model intercomparisons and will contribute to ISMIP6 and other intercomparison exercises. H. Goelzer is leading ongoing Greenland ice sheet intercomparisons in ISMIP6. F. Pattyn is leading the CalvingMIP project, which is part of EU-project PROTECT. Two workshops will be organized in 2023/24, one dedicated to ISMIP6 and one to the CalvingMIP.

Planned use of funds for 2022 to 2024

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
Ice sheets: weather versus climate	Workshop in Reykjavik	6350	E. Hanna	
Calving MIP	Workshop	3000	F. Pattyn	
ISMIP6/ISMASS	Workshop	2000	H. Goelzer	
Total		**11350**		

Any additional detail on funds usage and desired results/outcomes

SCAR funds are generally used to organize workshops and attend SCAR meetings. ISMASS uses the budget primarily to enable ECRs to attend meetings and workshops. The remainder is spent to comply with publication costs and workshop organizations (see planned activities).

Percentage of the budget to be used for support of early-career researchers

2022:50% *(Was 80% but for SCAR it is more like 50% since we focused CliC and IASC on ECS)*.

2023:50%

2024:50%

Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2022:

2023:

2024:

Membership

Leadership

Role	First Name	Last Name	Affiliation	Country	Primary Language	Email	Date Started
Chair	Heiko	Goelzer	NORCE	Norway	German	heig@norceresearch.no	
SCAR representative	Frank	Pattyn	ULB	Belgium	Dutch/French	Frank.Pattyn@ulb.be	
CliC representative	Edward	Hanna	Lincoln University	UK	English	ehanna@lincoln.ac.uk	
IASC representative	Gudvinna	Adalgeirsdottir	University Iceland	Iceland	Icelandic	gua@hi.is	
	Catherine	Ritz	IGE	France	French	Catherine.ritz@univ-grenoble-alpes.fr	

*(Please identify early-career researchers with * in first column)*

Other members

First Name	Last Name	Affiliation	Country	Primary Language	Email
Dan	Dixon	University of Maine	USA	English	Daniel.Dixon@umit.maine.edu
Xavier	Fettweis	ULiège	Belgium	French	Xavier.fettweis@uliege.be
Andrew	Shepherd	University of Leeds	UK	English	A.Shepherd@leeds.ac.uk
Pippa	Whitehouse	Durham University	UK	English	Pippa.whitehouse@durham.ac.uk
Florence	Colleoni	OGS Trieste	Italy	Italian	fcolleoni@inogs.it
Ellyn	Enderlin	University of Maine	USA	English	Ellyn.enderlin@gmail.com
David	Holland	New York University	USA	English	David.holland@nyu.edu

*(Please identify early-career researchers with * in first column)*

Additional information (optional)

Notable Papers

(*Five to ten most notable papers – see the example below, which includes a brief statement (shaded) indicating the link to the group*)

1. Edwards, T. L., Nowicki, S., Marzeion, B., Hock, R., Goelzer, H., Seroussi, H., Jourdain, N. C., Slater, D. A., Turner, F. E., Smith, C. J., McKenna, C. M., Simon, E., Abe-Ouchi, A., Gregory, J. M., Larour, E., Lipscomb, W. H., Payne, A. J., Shepherd, A., Agosta, C., Alexander, P., Albrecht, T., Anderson, B., Asay-Davis, X., Aschwanden, A., Barthel, A., Bliss, A., Calov, R., Chambers, C., Champollion, N., Choi, Y., Cullather, R., Cuzzone, J., Dumas, C., Felikson, D., Fettweis, X., Fujita, K., Galton-Fenzi, B. K., Gladstone, R., Golledge, N. R., Greve, R., Hattermann, T., Hoffman, M. J., Humbert, A., Huss, M., Huybrechts, P., Immerzeel, W., Kleiner, T., Kraaijenbrink, P., Le clec'h, S., Lee, V., Leguy, G. R., Little, C. M., Lowry, D. P., Malles, J. H., Martin, D. F., Maussion, F., Morlighem, M., O'Neill, J. F., Nias, I., Pattyn, F., Pelle, T., Price, S. F., Quiquet, A., Radić, V., Reese, R., Rounce, D. R., Rückamp, M., Sakai, A., Shafer, C., Schlegel, N. J., Shannon, S., Smith, R. S., Straneo, F., Sun, S., Tarasov, L., Trusel, L. D., Van Breedam, J., van de Wal, R., van den Broeke, M., Winkelmann, R., Zekollari, H., Zhao, C., Zhang, T., and Zwinger, T.: Projected land ice contributions to 21st century sea level rise, Nature, 593(7857), 74–82, https://doi.org/10.1038/s41586-021-03302-y, 2021.

2. Payne, A. J., Nowicki, S., Abe-Ouchi, A., Agosta, C., Alexander, P., Albrecht, T., Asay-Davis, X., Aschwanden, A., Barthel, A., Calov, R., Chambers, C., Choi, Y., Cullather, R., Cuzzone, J., Dumas, C., Edwards, T., Felikson, D., Fettweis, X., Goelzer, H., Golledge, N. R., Gregory, J. M., Greve, R., Hatterman, T., Hoffman, M. J., Humbert, A., Huybrechts, P., Jourdain, N. C., Kleiner, T., Larour, E., clec'h, S. L., Lee, V., Leguy, G., Lipscomb, W. H., Little, C. M., Lowry, D., Morlighem, M., Nias, I., Pattyn, F., Pelle, T., Price, S., Quiquet, A., Reese, R., Rueckamp, M., Schlegel, N.-J., Seroussi, H., Shepherd, A., Simon, E., Slater, D., Smith, R., Straneo, F., Sun, S., Tarasov, L., Trusel, L. D., Breedam, J. V., van de Wal, R., van den Broeke, M., Winkelmann, R., Zhao, C., Zhang, T., and Zwinger, T.: Future sea level change under CMIP5 and CMIP6 scenarios from the Greenland and Antarctic ice sheets, Geophys. Res. Lett., https://doi.org/10.1029/2020GL091741, 2021.

   The Ice Sheet Model Intercomparison Project for CMIP6 (ISMIP6), with ISMASS chair Heiko Goelzer taking a leading role in the Greenland projections, has delivered several key publications that formed an important basis for sea-level projections of the latest IPCC assessment report (AR6).

3. Sun, S., Pattyn, F., Simon, E. G., Albrecht, T., Cornford, S., Calov, R., Dumas, C., Gillet-Chaulet, F., Goelzer, H., Golledge, N. R., Greve, R., Hoffman, M. J., Humbert, A., Kazmierczak, E., Kleiner, T., Leguy, G. R., Lipscomb, W. H., Martin, D., Morlighem, M., Nowicki, S., Pollard, D., Price, S., Quiquet, A., Seroussi, H., Schlemm, T., Sutter, J., van de Wal, R. S. W., Winkelmann, R., and Zhang, T.: Antarctic ice sheet response to sudden and sustained ice-shelf collapse (ABUMIP), J. Glaciol., 1-14, https://doi.org/10.1017/jog.2020.67, 2020.

   Model Intercomparison study that evaluates the response of the Antarctic ice sheet to a complete removal of all ice shelves. Important community paper

studying and the end member sensitivity of the Antarctic ice sheet, co-lead by Frank Pattyn

Direct support from outside organisations received for your activities

1. WCRP-CliC: 6000 CHF
2. IASC: 12783 Euros

Major collaborations your group has with other SCAR groups and with organisations/groups beyond SCAR

Within SCAR

1. INSTANT. (Florence Colleoni is co-lead and F. Pattyn, C. Ritz and Heiko Goelzer are members)

Outside SCAR

1. IASC Cryosphere Working Group (T; Aðalgeirsdóttir is also the Chair)
2. WCRP-CliC (E. Hanna is also CliC activity leader, H. Goelzer is one of the scientific steering committee members of ISMIP6)
3. WCRP Grand Challenge on Regional Sea Level and its impacts (H. Goelzer is member)
4. WCRP Lighthouse activity Safe Landing Climates (H. Goelzer is leading the working group Sea Level Rise)

Outreach, communication and capacity-building activities

Due to ongoing Covid-19, ISMASS outreach and communication activities were reduced during this reporting period

Contributions to equality, diversity, and inclusion (EDI)

We have invited APECS under EDI guidelines to help in the process of selecting an ECS scientist to work in the organizing committee in preparation for the upcoming workshop “Ice Sheets: Weather versus Climate”. This has led to increasing diversity in the organizing committee.

We have allocated the largest share of funding available for the workshop to support a diverse group of ECS with travel funding, selected in an open competition under EDI guidelines in collaboration with APECS and the recruited ECS on the organizing committee.